LAWRENCE LIVERMORE REPORT

Editor's note: Beginning this week, Lawrence Livermore Report moves to a Monday distribution. We hope you are enjoying this weekly collection of scientific and technological achievements. Date: May 12-May 19, 2008.

To catch a plutonium thief, try antineutrinos

SCIENTIFIC AMERICAN

A new, more secure technology for guarding against theft from nuclear reactors has passed its first test.

Researchers from Lawrence Livermore National Laboratory and Sandia National Laboratories successfully monitored the power output of a relatively small nuclear power reactor by measuring the number of antineutrinos -- ghostly particles generated by nuclear fission -- that struck a refrigerator-size tank of liquid.

The findings are reported in *Scientific American.* For more, see http://www.sciam.com/article.cfm?id=to-catch-a-plutonium-thief-try-antineutrinos

Shaping the future of aneurysm treatments

Livermore researchers (left to right) Thomas Wilson (in background), Ward Small and Jason Ortega prepare shape-memory foam plugs for the crimping machine.

Each year, about 30,000 people in the United States die or suffer neurological damage from cerebral aneurysms, which form when a weak or thin region on a

blood vessel in the brain bulges and fills with blood. If left untreated, an aneurysm can grow until it leaks or ruptures, spilling blood into the surrounding tissue and causing a hemorrhagic stroke.

Lawrence Livermore researchers are collaborating with colleagues from the University of California Davis Center for Biophotonics, Science and Technology and from UC Berkeley to develop safer, faster and more cost-effective treatments for patients with cerebral aneurysms. Using special shape-memorizing "smart" foams, the team developed an alternative treatment -- a "plug" that isolates an aneurysm from the rest of the vascular system. As the plug expands, it absorbs blood, which congeals and forms clots to stop blood flow inside the aneurysm.

For more, see https://www.llnl.gov/str/MaJune08/maitland.html

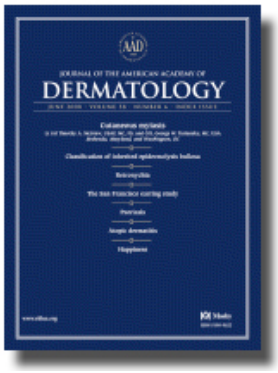
Electronic nose sniffs out chemical agents

A team of researchers from the Laboratory's physics and chemistry directorates are developing a new compact and low-power sensor array capable of detecting vapor from oily nerve and blister agents such as VX and sulfur mustard.

The device operates using an array that sports what principal investigator Brad Hart likens to little silicon diving boards. Each of these microcantilevers has a chemically selective coating. When the polymer coating on top absorbs vapor, the surface swells and bends the cantilever. The pattern of deflection across the array indicates a unique chemical signature.

Their work is the subject of a May cover story in *The Analyst.* For more see http://www.rsc.org/Publishing/Journals/AN/article.asp?doi=b713758c

Lab program reduces melanoma



A study of a past melanoma screening program at the Laboratory found that the program helped employees avoid a serious form of skin cancer that often results in death. Putting aside employees already diagnosed with melanoma when the program started, there were zero deaths at LLNL during the study years 1984-96.

The study is published in the May issue of the *Journal of the American Academy of Dermatology*.

The Lab screening program is the first early skin cancer detection campaign ever to have demonstrated a decrease in mortality from melanoma, according to the study. The study was authored by Dr. Jeffrey Schneider, a Kaiser Permanente physician and chief dermatologist for the screening program, and Dan Moore and Mortimer Mendelsohn, both former members of the Laboratory's biomedical program.

For more, see
https://newsline.llnl.gov/articles/2008/may/05.09.08_melanoma.php

A guiding light

National Ignition Facility (NIF) researchers Constantin Haefner (sitting) and Kevin Williams work on the Advanced Radiographic Capability (ARC) Petawatt Laser. ARC will generate hard X-rays for multi-frame radiography of imploding capsules,

a capability that is critical to the success of the National Ignition Facility's mission for laser-driven fusion.

LLNL is managed by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy's National Nuclear Security Administration.

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